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ertia—at another it has looked more like a radical, as a storehouse of energy, endowed occasionally in the higher flights of the imagination with a reasonable soul, sometimes it has taken very high ground as a point singularity in a mathematical function, and now in its weariness it has at last compromised itself by claiming to be not an atom at all, but a solar system of electrons, each of these being that simple and transparent thing—a center of strain in the ether. However, in all these guises it has never ceased to be a useful conception to the working chemist and thereby has justified its existence. All these changes serve to emphasize two matters of some importance. The first is that it is well for us men of science to realize the limitations of our knowledge and to recognize that we don't know much about an atom, or of any of those concepts which we often so loosely describe as fundamental. Tyndall rightly objected to people who professed to be too much in the secrets of providence. He certainly, however, exposed himself to attack when he launched the famous phrase that caused so much fluttering in the dovecots—the statement that he could see within an atom “the promise and the potency of all that is.” It is a legitimate flight of the scientific imagination to see anything at all in an atom; but it may be expedient for the special purposes of science not to see too much.

The other point suggested by recent experiences is that we should pay more serious attention than we usually do to the logic of science and have as clear ideas as possible as to what we are really aiming at, as to what we can reasonably expect to do and not to do. I doubt very much whether it is wise to wait in patient expectation for the years that bring, or are supposed to bring, the philosophic mind. A little artificial stimulus towards philosophy might accelerate the process. It seems to me extremely unfortunate that men of science are still so much scared by the bogey of metaphysics. What we have to be afraid of is not metaphysics but bad metaphysics, and it is difficult to accept the simple faith of many a man of science that his metaphysics is to be

preferred to any other brand merely because it is either unconscious or naïve. A little quiet thought and study should at least have the good effect of enabling us to preserve our calm when things seem to be tumbling down. It should help us to realize that a science like chemistry is above all else a work of art, and that concepts like atoms, energy and the like are not much more than pigments with which we paint our pictures. The next generation may find new pigments or mix the old ones differently. Let us hope that they will find the same artistic satisfaction in filling in the picture and that the effect will be even more beautiful than is your science of to-day.

THE SALARIES OF PROFESSORS AT YALE UNIVERSITY¹

WE are face to face with a necessity which we must meet in order to continue to do our work properly; and that necessity is a substantial increase of the salaries of many members of the teaching force. For those who are giving full time to the work of instruction our present normal salary scale is as follows: Instructors, first year, \$1,000; second year, \$1,200; third year, \$1,400, fourth year and thereafter, \$1,600; assistant professors, first term of service, \$1,800; second term of service, \$2,500; professors, \$4,000.

It is at the very top, in the matter of salaries of professors themselves, that the inadequacy of our present rate of pay is most strongly felt. It is there that the legitimate demands of the individual and the legitimate needs of the university coincide in demanding large increases of salary.

To begin with, this is the one point in which we stand, we think, at a disadvantage as compared with our competitors. The salaries of Yale professors doing full work run all the way from \$3,500 to \$5,000; but the number who receive \$5,000, or even \$4,500, is comparatively small. Harvard, on the other hand, has a scale of professional salaries running from \$4,500 to \$5,500; and the number of professors who are there on the highest grade or have reasonable expectation of being so, is very

¹ From the annual report of President Hadley.

large: Harvard is probably the only university where the average salary of a full professor is higher than ours. But there are a number of institutions which offer individual members of their professional staff who can do exceptionally good service salaries ranging from \$6,000 to \$7,500.

But why, it may be asked, has this difference been allowed to exist so long? Why have the best Yale professors only received \$4,000, or at most \$5,000, while men of equal rank at other institutions have obtained substantially larger pecuniary returns? There are two main causes for this, both of which, curiously enough, have arisen within the professorial body itself. One is the fact, wholly creditable to our professors, that they have cared more for the extension of their teaching facilities than for the increase of their pay; the other is the spirit of professional equality which is zealous of all discriminations, no matter what their ground may be.

The permanent officers are quite ready to allow some distinguished man of mature years to be called from abroad with their approval at a salary higher than their own. They are rather unwilling to let some of their own associates, equally good, be given a similar salary by act of the corporation. They hold that in general all the professors in the same faculty should have the same salary, because they believe that this is the only way in which professorial independence can be secured.

It seems clear that the corporation has not only the right but the duty to raise the salary of a man who is now receiving \$4,000 to \$6,000 if that man clearly merits the increase, without being thereby compelled to raise the salary of another man in similar position who is rendering the institution little or no service. The corporation which calls a man to Yale as a professor agrees to pay him \$4,000 as long as he is guilty of no grave dereliction which warrants that body in demanding his resignation. It does not agree that it will always pay him as much as any of his colleagues; nor does it agree that he and his colleagues in joint meeting shall have the right and duty to decide upon his salary increase.

It is essentially a matter between the corporation and the individual.

If this principle is once accepted there will be no difficulty in putting Yale on a full equality with her strongest competitors in the matter of professors' salaries. If this is not accepted, the only alternatives are to raise all salaries alike or to have the members of the faculty discuss in one another's presence the relative shares which each should have. The first of these alternatives is unsatisfactory; the second positively bad. It appears far less dangerous, as well as far more practicable, to let the corporation arrange salaries and salary schedules with the advice of the deans or directors, with the full understanding that they may deal with individual cases on their merits.

The salaries which we pay assistant professors have been characterized as low. It may not improbably be desirable to raise the rate of pay for the first appointment as assistant professor from \$1,800 to \$2,000. The case of the assistant professors in their second term who are now receiving \$2,500 presents more difficulty. As we look at each individual case the payment seems conspicuously inadequate. Many of these men have been teaching a dozen years; most of them are married; some have families of considerable size. They are competent scholars and devoted teachers. As individuals they deserve higher pay. As a policy, I am inclined to think that it would be a mistake to give them higher pay.

Why this apparent contradiction? Because it is bad both for the university and for the man himself to make a subordinate position too attractive for a man who is not likely to reach the top. If a man after eight years' work as an assistant professor has not proved his claim to promotion, the chances are that he never can prove it. What shall we do? Recognize his merit by a moderate increase of salary which will encourage him to stay, or indicate to him frankly that he had better seek his fortune elsewhere? The latter alternative is sometimes hard to put into effect, but I am convinced that it is true kindness.

A man can get a new position far more easily at thirty or thirty-five than he can at forty. The difficulties in making the change are less; the possibilities open to him after the change are on the whole greater. He can more easily adapt himself to new conditions; he has more years in which to build up an independent reputation. No such man should be compelled to leave Yale's service with inadequate notice. That would be unfair to him and suicidal to Yale. But it is, I believe, in the interests of all parties, and conspicuously in the interest of the assistant professor himself, that he should be encouraged to go elsewhere rather than kept at home by an advance in salary which, however attractive for the moment, is bound to be unsatisfactory in the long run.

In the case of assistant professors whom we have for one reason or another kept at Yale until they have become to all intents and purposes permanent officers, an increase of salary to \$3,000 is probably wise and justifiable. But a salary scale which should increase the number of officers of this kind does not appear to be wise.

SCIENTIFIC NOTES AND NEWS

PROFESSOR THEODORE W. RICHARDS, of Harvard University, has accepted the invitation of the Chemical Society (London) to deliver the next Faraday Lecture, at a date to be announced later. This will be the tenth Faraday Lecture, the others having been given by the following chemists and physicists; Dumas, 1869; Cannizzaro, 1872; Hofmann, 1875; Wurtz, 1879; Helmholtz, 1881; Mendeléef, 1889; Rayleigh, 1895; Ostwald, 1904; Emil Fischer, 1907.

PRINCETON UNIVERSITY has conferred its doctorate of laws on Dr. William H. Welch, professor of pathology at the Johns Hopkins University.

YALE UNIVERSITY has conferred its doctorate of laws on Dr. C. D. Walcott, secretary of the Smithsonian Institution; its doctorate of letters on Mr. John Burroughs, and its doctorate of science on Dr. T. B. Osborne, chemist at the Connecticut Agricultural Experiment Sta-

tion, and on Dr. Simon Flexner, director of the Rockefeller Institute for Medical Research.

HOBART COLLEGE has conferred the degree of doctor of science on Dr. Warren P. Lombard, professor of physiology at the University of Michigan and Dr. Henry Rutgers Marshall, of New York.

RUTGERS COLLEGE has conferred the degree of doctor of science on Dr. Egbert LeFevre, of the class of 1880, dean of the medical faculty of the University of New York, and Professor Francis Cuyler Van Dyck, of the class of 1865, professor of physics and dean at Rutgers.

ST. JOHN'S COLLEGE, at its commencement on June 15, conferred the degrees of LL.D. on Dr. Marcus Benjamin, of the U. S. National Museum.

At the meeting of the trustees of Cornell University, June 23, Professor Burt G. Wilder, the last active member of the original faculty, having resigned after a service of forty-two years, was made emeritus professor of neurology and vertebrate zoology.

PROFESSOR WESLEY MILLS is retiring from the chair of physiology at McGill University after twenty-five years' service.

DR. ALFRED G. MAYER, director of the department of marine biology of the Carnegie Institution of Washington, has been appointed lecturer in biology at Princeton University for next year.

DR. W. H. BOYNTON, instructor in pathology in the New York State Veterinary College, has left for the Philippine Islands, where he has accepted the position of pathologist of the veterinary service.

MR. P. H. COWELL, first assistant in the Greenwich Observatory, has been appointed director of the Nautical Almanac.

DR. WILLIAM EDWARD STORY, professor of mathematics at Clark University since 1889, was presented with a loving cup and a volume of letters from many of his mathematical friends at a banquet given in his honor at the Worcester Club on the evening of Monday, June 13. The book of letters contained one